# CONFIDENTIAL

MINUTES 6 May 1952

## Conference on Battery-Operated Lights for Marking Landing Strips

Held on 30 April 1952 in the Control Room, Building 45, Equipment Laboratory, Weapons Components Division, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio.

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**Present:**

Hq. USAF
Major Fred C. Huffman - AFDRQ
Mr. G. K. Clement - AFOAI-P
Major H. C. Aderholt
Major G. M. Foster

Hq. Air Research and Development Comma
Major Harmon G. Stech

Hq. Military Air Transport Service
Major Edward T. Davis - MAOMQ
Lt. Commander W. D. Windley - MAOMQ

Hq. Air Resupply and Communication Service
Lt. Col. J. A. Provan
Major C. G. Moeller
1st Lt. C. W. Matt

Air Proving Ground Command
Capt. Howard F. Mason

Corps of Engineers
Mr. Eldon M. Clark - ERDL, Ft. Belvoir

Signal Corps
Mr. F. P. Schiro - SCEL, Ft. Monmouth

Army Field Forces Liaison Office
Lt. Col. Harry T. Shively - MCLADA, W-PAFB

Wright Air Development Center
Major P. H. Greenlee - WCEEE5
Mr. G. M. Kevern - WCEEE5
Mr. A. E. Wallis - WCEEE5

**Factual Data:**

1. The conference was convened at 0925 hours by Major Greenlee who acted as chairman. Col. H. A. Boushey, Chief, Equipment Laboratory, was introduced and welcomed the group to the laboratory.



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2. Major Greenlee stated that the purpose of the conference was to determine the various applications for battery-operated lights for marking landing strips and then to determine detailed requirements for these applications as desired by the using organizations.

3. The group then adjourned to the photometric tunnel where eight sample lights were demonstrated. These samples included both flashing and steady-burning lights having both incandescent and gaseous tube sources. Six samples were equipped with ordinary dry cell batteries while two samples were of the "blister" battery type. This type is considered to have an indefinite shelf life since the electrolyte is stored in a glass vial which is broken when the battery is put into service. In addition, Mr. Schiro of the Signal Corps Engineering Laboratory demonstrated a water-activated battery with a 6 volt, 0.50 ampere lamp normally used on meteorological balloons. This battery was described as having the following characteristics:

a. Indefinitely long shelf life.

b. Small size (approximately 3 1/2" x 1 3/8" x 1")

c. Light weight (approximately 2 1/2 ounces)

d. Life - 1.3 hours with 0.5 ampere lamp

e. No loss in efficiency at extremely low temperatures

f. Can be activated with water from any source.

The bare lamp candlepower of this lamp-battery combination was found to be approximately one candle. The Signal Corps nomenclature for the battery is BA-253/U and for the complete unit including battery, lamp, and adapter, ML-38.

4. Three of the sample lights which were demonstrated were flashing lights with gaseous tube sources. These lights were not considered satisfactory for marking landing strips since the flasher gave a jumping effect and, therefore, would not provide fixed reference points.

5. The conference was reconvened in the Control Room and the using organizations were invited to state their applications. Major Noeller stated that the Air Resupply and Communication Service needs a one-shot light for use in marking landing strips in enemy held territory for supply of guerrilla troops or evacuation of personnel.

6. Major Davis stated that MATS has a need for a similar light except with longer life to permit continuous operation from a temporary strip for at least one night.

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7. Mr. Clark stated that the Army need is for portable generator-operated lights for fields in combat areas which can be supported.

8. It was suggested that in order to best determine the detailed requirements such as candlepower, beam dimensions, etc., it would be desirable to install a medium-intensity lighting set at a training base in a remote area. This would provide a means for flight testing lights in any desired configuration and at various intensity settings. Shields could be fabricated to provide required directional security for the lights for test purposes. It was decided after further discussion that although the suggested program would be desirable, it was felt that sufficient information is now available to permit design of a light which will be satisfactory. Minor changes can be made, if necessary, after operational suitability tests are conducted by the Air Proving Ground Command.

9. The use of retro-directive reflectors for outlining landing strips was suggested; however, this would require a source of light on the airplane. Major Noeller stated that most ARC Service operations prohibit the use of any visible light on the airplane.

10. The following detailed requirements for a light for use by ARC Service were agreed upon:

a. Small size and light weight.- The lights may have to be carried on the person of using personnel for some time before they are used and therefore, this requirement is essential.

b. Long shelf life.

c. Battery life of 30 minutes to 1 hour.

d. One to three mile visibility under conditions of 3-mile object visibility. It is desirable that the intensity of the light be just sufficient to obtain the minimum visibility distances. Too much light is undesirable for security reasons. Available data on visibility of lights indicates that an intensity of approximately 25 candles should be sufficient.

e. Color.- White was selected for the following reasons:

(1) As flashing, gaseous tube lights are considered unsatisfactory, any color other than white must be obtained by using filters. In order to obtain the required candlepower of colored light, more energy would be required than for the same candlepower of white light due to absorption by the color filter. This would require the use of a larger battery to obtain a given life.

(2) White lights are more commonly seen even in combat areas and, therefore, are less likely to be investigated by enemy air patrols than colored lights.

f. One-time use.- The construction should be cheap and simple since the lights are not likely to be used more than once.

g. Directional security.- The light should be hooded so that it will be visible only from the approach area.

11. Detailed requirements to meet the MATS application are identical with those outlined for ARC Service with the following exceptions:

a. Life should be 24 hours.

b. Hood should be removable for use when directional security is not required.

12. The lights demonstrated earlier in the conference were then discussed in order to determine which light would most nearly meet these requirements. It was determined that the addition of a small reflector and hood and the modification of the socket and adapter of the light demonstrated by Mr. Schiro would provide a satisfactory light. Increased life, to meet the MATS requirement, can be obtained by the use of an adapter strip into which any number of batteries could be inserted in parallel to provide the desired life. The BA-253/U battery is already available through regular supply channels.

13. In order to make lights available to the using organizations as soon as possible, the following procedure was proposed:

a. ARDC will review the 1C priority now assigned this project to determine whether or not a higher priority can be assigned for portion to be accomplished by WADC.

b. WADC will fabricate 24 lights for use with BA-253/U batteries and supply these lights to Air Proving Ground Command.

c. Air Resupply and Communication Service will arrange for tests to be conducted by Air Proving Ground Command under a test program already established.

d. WADC will supply tentative nomenclature and estimated unit cost and ARC Service will supply quantity of lights needed to Directorate of Requirements, Headquarters, USAF for inclusion in fiscal year 1953 program (see footnote 1).

*(1). WADC has supplied the following information to Directorate of Requirements, Hq., USAF:.

Tentative Nomenclature.- Light, Marker, Temporary Landing Strip, (Battery-Operated) - Exhibit No. WCRTS-5-10.

Estimated Unit Cost (including Battery) - $3.00

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e. On receipt of APG test report, WADC will prepare a procurement specification for lights.

14. The meeting was adjourned at 1140 hours.

P. H. GREENLEE, Major, USAF
Acting Chairman

WCEWES/PHG/rm